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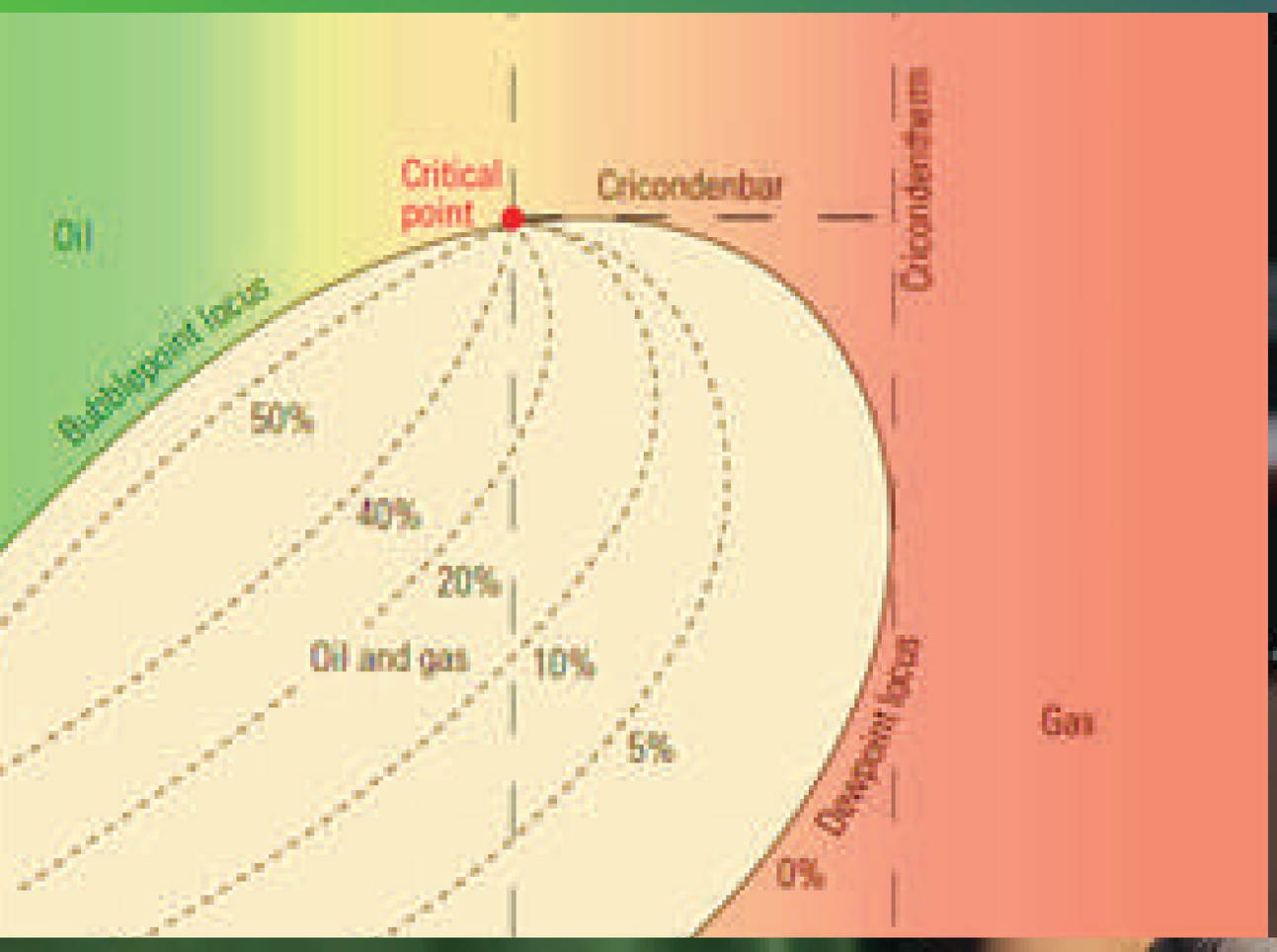
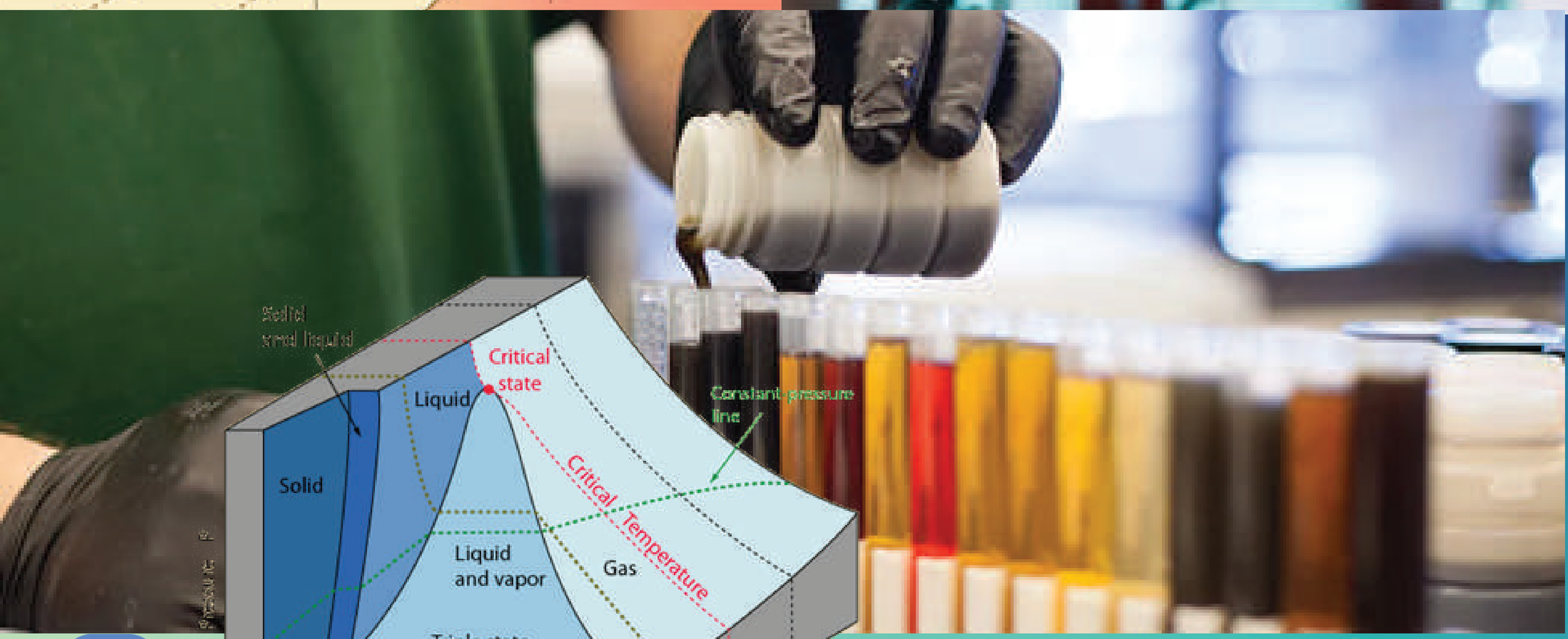
30+ HOURS OF HANDS-ON EXPERIENCE COURSE ON

ADVANCED PVT EOS & FLOW ASSURANCE MODELING





ZOOM

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DESCRIPTION

- Obtain awareness of technologies for characterization of reservoir fluids in-situ and methods for capture of a representative sample
- Obtain an extensive and practical knowledge to review the principles of fluid phase behavior
- Obtain awareness of the different fluid sampling techniques
- Learn the importance of proper sample handling and the procedures that define fluid properties (vapor-liquid equilibrium phase envelopes, gravimetric fluid properties, and hydrocarbon solids)
- Obtain awareness of the different laboratory analysis techniques
- Understand how to interpret a PVT report
- Know how to prepare the PVT input for simulator
- Get a hands-on demonstrations include developing mathematical models using equations of state (EOS) for fluid PVT analysis for applications in reservoir simulations, production modeling, and surface processing
- Model different flow assurance problems: hydrate formation, wax simulation & tuning, and Asphaltene deposition
- Water chemistry and analysis
- Water-water compatibility testing
- Scale prediction and flow assurance mitigation

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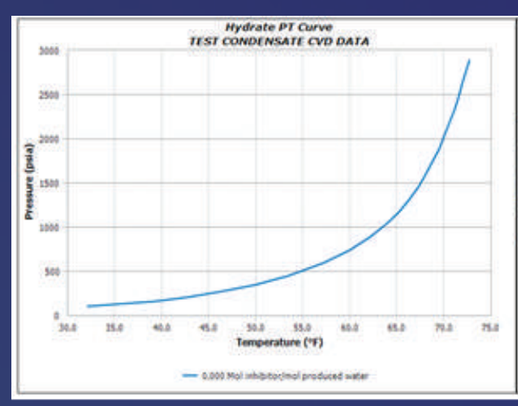
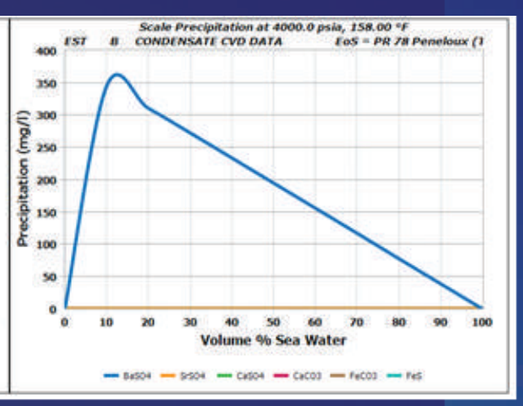
WHO SHOULD ATTEND

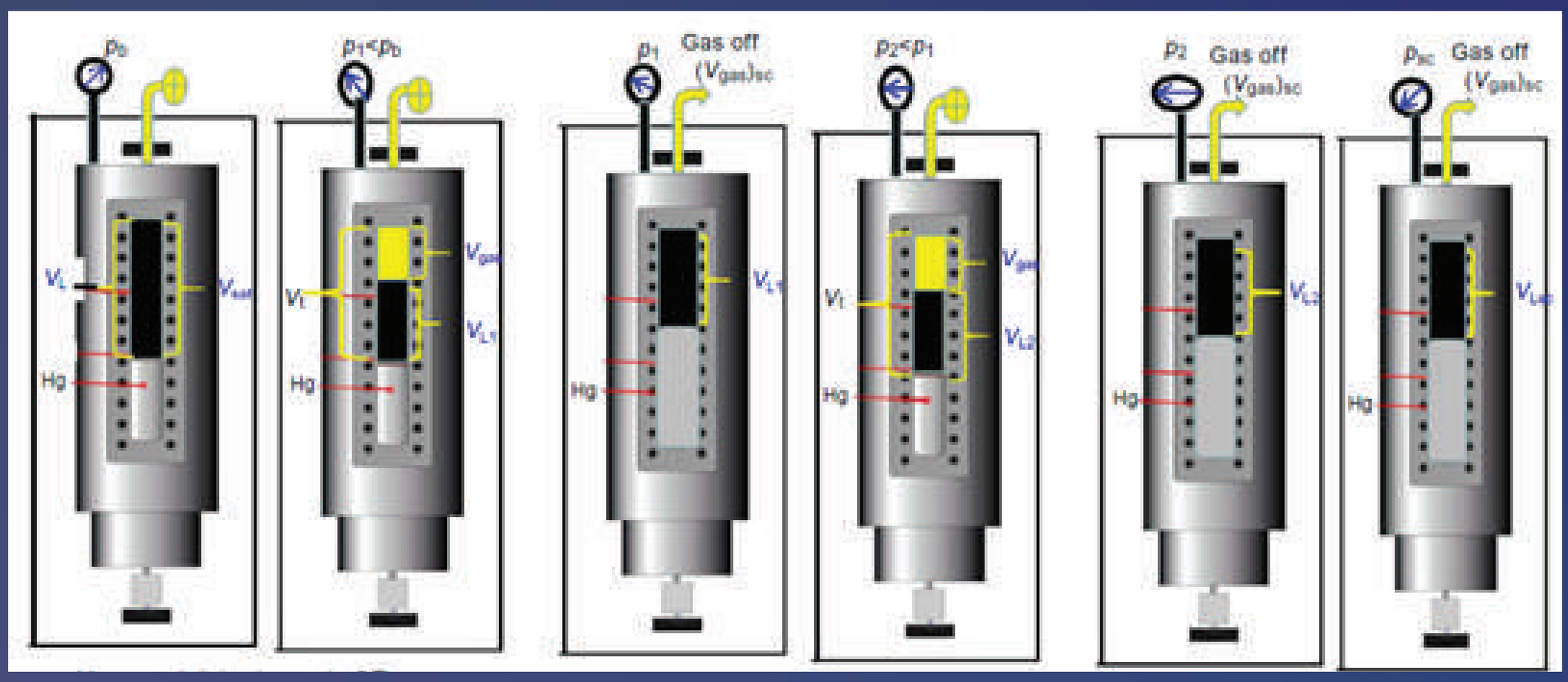
- Petroleum Engineers
- Reservoir Engineers
- Production Engineers
- Processing Engineers





WAYS & MEANS

- Interactive courses and exercises
- Workshop using real-field case data
- Hands-on practice using software



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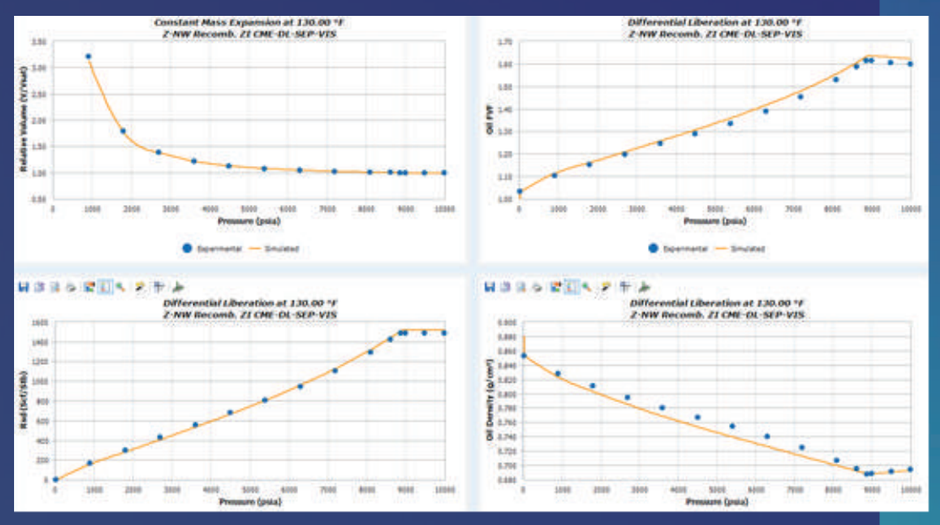
CONTENTS

- Applications of PVT Data
- Reservoir Fluid Sampling & Downhole Fluid Analyzer
- Sample Quality Control
- Hydrocarbon Phase Behaviour
- Classifications of the Reservoir Fluids
- Analysis of Reservoir Fluid Properties
- PVT Laboratory Experiments and Fluid Studies
  - Constant Composition Expansion
  - Differential Vaporization Test
  - Separator Tests
  - Constant-Volume Depletion (CVD) Test
  - Viscosity Measurements
  - Swelling Testing
  - Minimum Miscibility Pressure
  - Slim-tube Test
- Gas Condensate Procedures
- Quality Checking Laboratory Reports
- PVT Properties: Natural Gas, Black Oil & Water Brine



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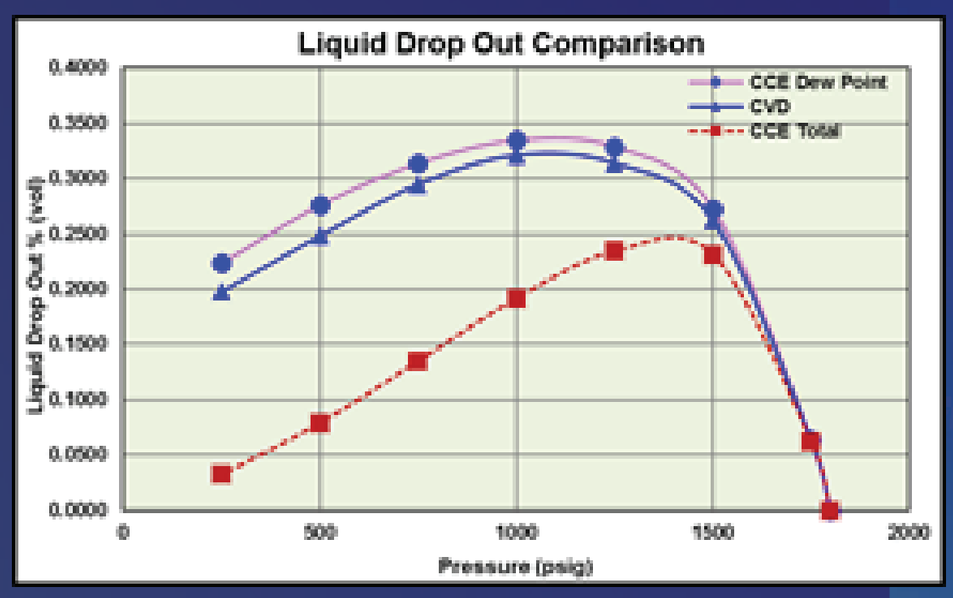
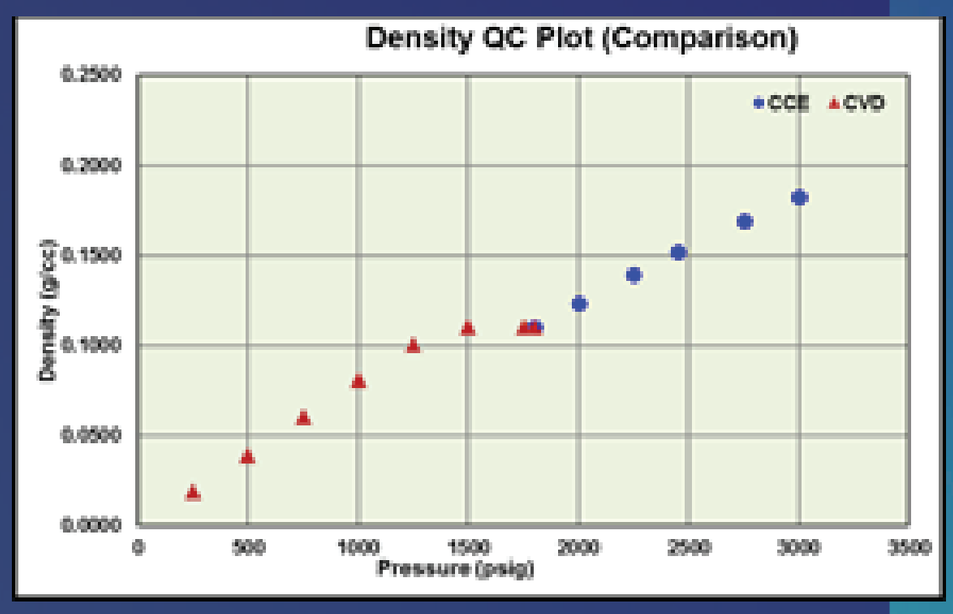
CONTENTS

- PVT Modelling
- PVT Data Validation & Reports QA/QC
- Quality Assessment & Consistency Evaluation of Hydrocarbon PVT Data
- Black Oil Properties & Correlations
- Dry Gas Properties
- Development of the Equation of State
- Types of Equations of State
- Vapor-Liquid Equilibrium
- Applications of the Equation of State
- Simulation Considerations for PVT Modeling
- Black Oil vs. Compositional Simulation
- PVT Measurement & Simulation by EOS
- Characterizing Hydrocarbon-Plus Fractions
- Flash Calculations
- Mixing Rules for Pseudo-Critical Properties
- Splitting and Lumping
- EOS Tuning and Data Requirement
- Regression of PVT Data
- Simulation of Gas Injection
- Miscibility and Miscible Floods
- Flow Assurance Problems
- Hydrate Formation: Prediction and Identifying Minimum Inhibitor
- Wax Simulation: Wax Appearance Temperature & Tuning
- Asphaltene Deposition & Conditions
- Water Chemistry and Analysis
- Water-water Compatibility Testing
- Scale Prediction





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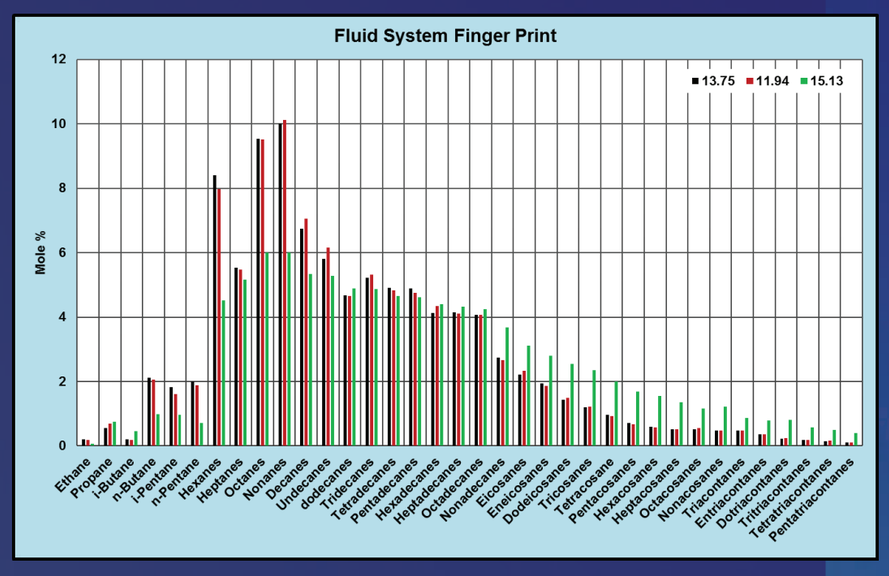
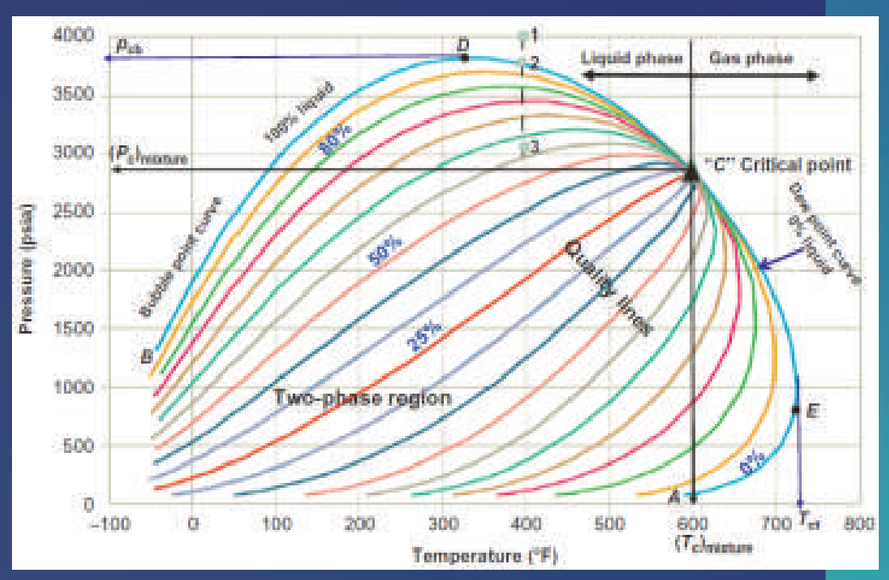
COURSE OUTLINES

Module 1 –Reservoir Fluids & Downhole Sampling



- Overview of Reservoir Engineering
- Oilfield development Process
- Applications of Reservoir Fluid Data
- Overview of Formation Testers
- Reservoir Fluid Sampling
- Downhole Fluid Analyzers (LFA, OFA, CFA, etc.)
- Wireline Fluid Sampling (MDT and RDT tools)
- Fluid Sample Quality Control
- Types and Interpretation of Pre-tests

Module 2 –Phase Behavior & Fluid Properties



- Analysis of Reservoir Fluids
- Classifications of the Reservoir Fluids
- Hydrocarbon Phase Behavior
- Reservoir Fluid Properties
- Black Oil Properties & Correlations
- Dry Gas Properties
- Formation Water Properties
- PVT Modeling

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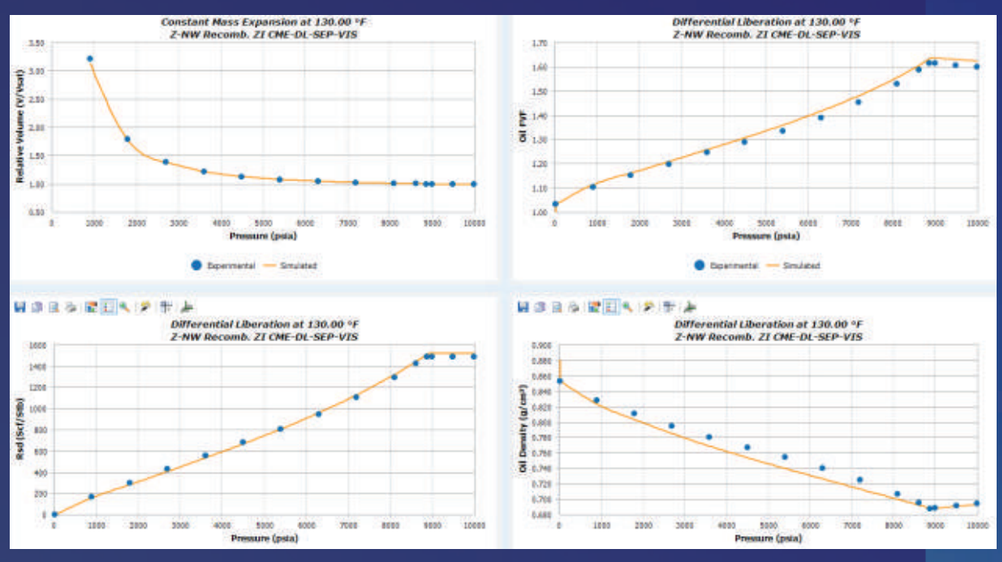
COURSE OUTLINES

Module 3 –Laboratory Experiments for Oil & Data QA/QC

- Constant Composition Expansion
- Differential Vaporization Test
- Separator Tests
- Constant-Volume Depletion (CVD) Test
- Viscosity Measurements
- Swelling Testing
- Minimum Miscibility Pressure
- Slim-tube Test
- PVT Data Validation & Reports QA/QC
- Quality Assessment & Consistency Evaluation of Hydrocarbon PVT Data



Module 4 –Laboratory Experiments for Gas Condensate & Data QA/QC

- Gas Condensate Procedures
- Constant Composition Expansion
- Separator Tests
- Constant-Volume Depletion (CVD) Test
- Quality Checking Laboratory Reports
- PVT Data Validation & Reports QA/QC
- Quality Assessment & Consistency Evaluation of Hydrocarbon PVT Data

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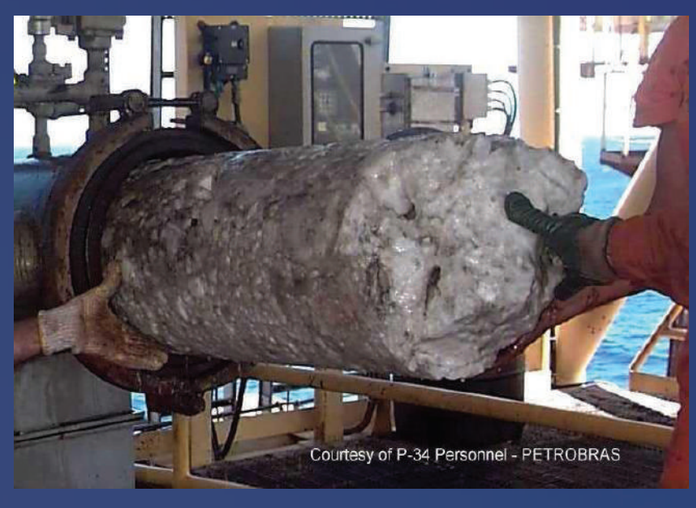
COURSE OUTLINES

Module 5 –Equations of State Modelling

- Development of the Equation of State
- Types of Equations of State
- Vapor-Liquid Equilibrium
- Applications of the Equation of State
- Simulation Considerations for PVT Modeling
- Black Oil vs. Compositional Simulation
- PVT Measurement & Simulation by EOS

Module 6 –Equations of State Characterization

- Development of the Equation of State
- Types of Equations of State
- Vapor-Liquid Equilibrium
- Applications of the Equation of State
- Simulation Considerations for PVT Modeling
- Black Oil vs. Compositional Simulation
- PVT Measurement & Simulation by EOS



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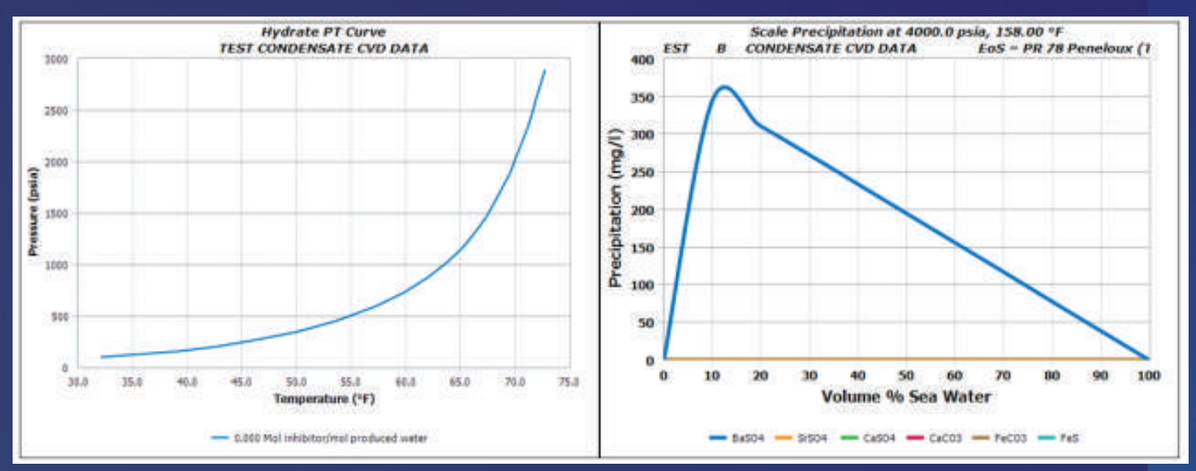
COURSE OUTLINES

Module 7 –Software Applications

- Fluid Handling and Definition
- Equations of State Parameters
- PVT Data Regression
- Correction Factors
- Interaction Parameters
- Cleaning of Mud Contamination
- QAQC of Fluids



Module 8 –Software Applications

- PVT modeling for a Black Oil Sample
- PVT modeling for a Gas Condensate Sample
- Simulation of Gas Injection
- Miscibility and Miscible Floods
- Software Applications
  - Flow Assurance Problems
  - Hydrate Formation: Prediction and Identifying Minimum Inhibitor
  - Wax Simulation: Wax Appearance Temperature & Tuning
  - Asphaltene Deposition & Conditions
  - Hydrate Conditions and Prediction
  - Water Chemistry and Analysis
  - Water-water Compatibility Testing
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